

Figure 1. Northwest Atlantic from Newfoundland to North Carolina showing Northwest Atlantic Fishery Organization (NAFO) subareas and divisions. Principal USA sea scallop resources are located on Georges Bank (Subdivision 5Ze), in the Middle Atlantic (Statistical Area 6 encompassing Subareas 6A, 6B, and 6C), and in the Gulf of Maine (Division 5Y).

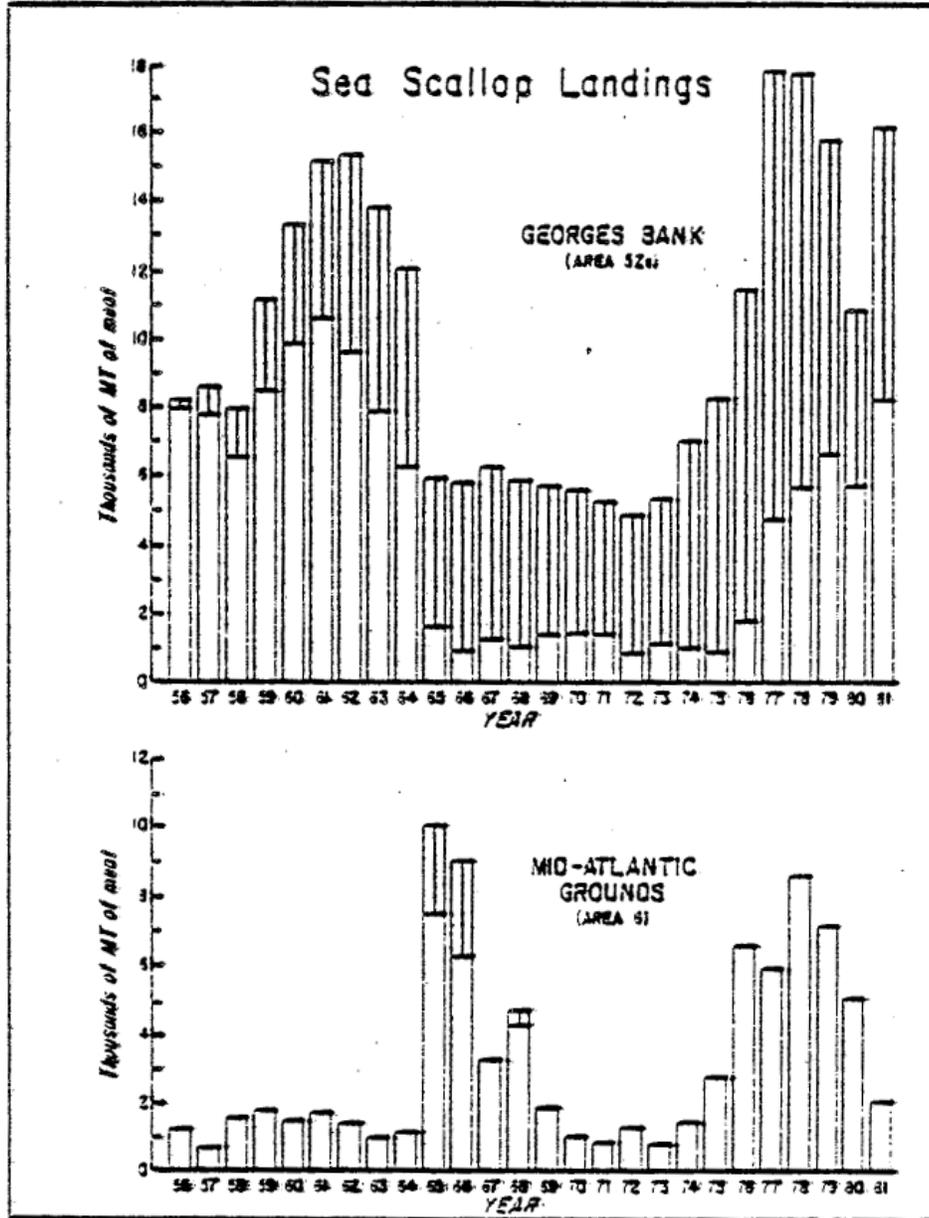


Figure 2. Total United States and Canadian commercial sea scallop landings (metric tons, meats) from Georges Bank (Area 5Ze) and the Middle Atlantic (Area 6), 1956-1981. The upper lined portions of the bars represent Canadian landings.

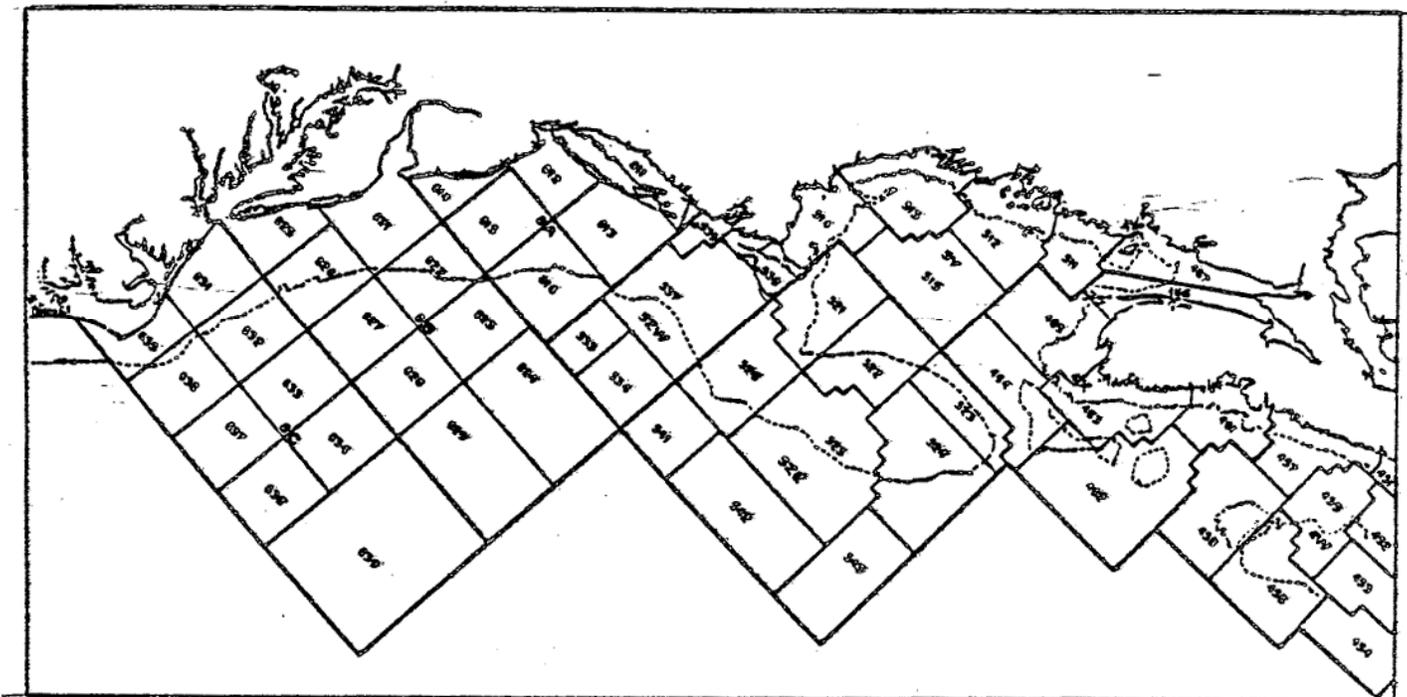


Figure 3. Commercial statistical reporting areas in the Northwest Atlantic from Nova Scotia to Cape Hatteras, North Carolina. Principal statistical areas from which sea scallops have been landed include: Georges Bank (Areas 521-526), the Middle Atlantic (Areas 611-616, 621-622, 623-626, 631-632), and the Gulf of Maine (Areas 511-515). Sea scallop landings on Georges Bank and the Middle Atlantic are often aggregated by three major fishing regions within each geographical unit: Georges Bank (South Channel: Areas 521, 522, and 526; Southeast Part: Area 525; and Northern Edge and Peak: Areas 523 and 524); Middle Atlantic (New York Bight: Areas 611-616; Delmarva: Areas 621-626; and Virginia-North Carolina: Areas 631-632).

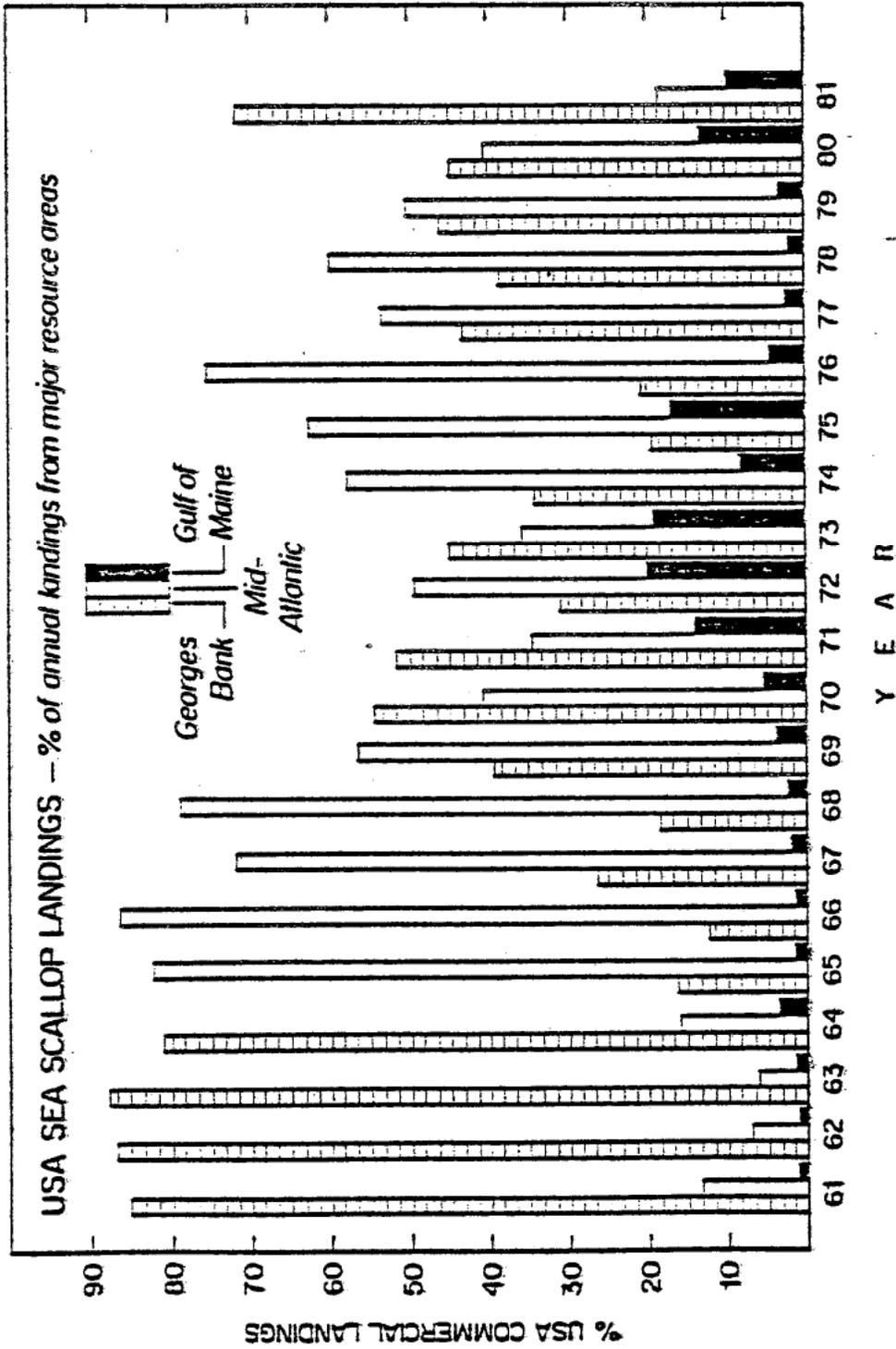


Figure 4. Percentage distribution of total annual USA commercial sea scallop landings (metric tons, meats) from Georges Bank (Area 5Ze), the Mid-Atlantic (Area 6) and the Gulf of Maine (Area 5Y), 1961-1981.

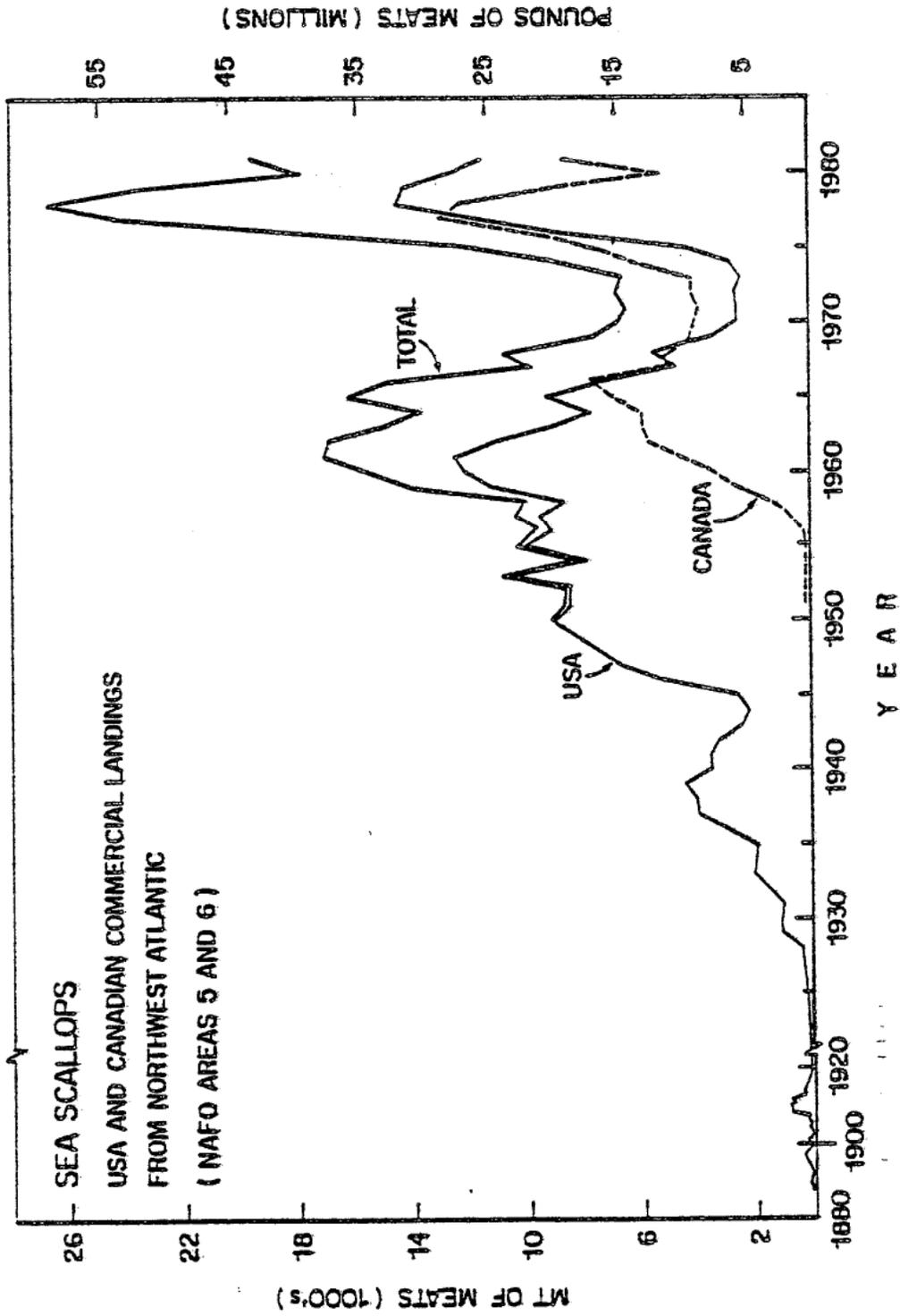


Figure 5. USA and Canadian commercial sea scallop landings from the Northwest Atlantic (NAFO Areas 5 and 6), 1887-1981.

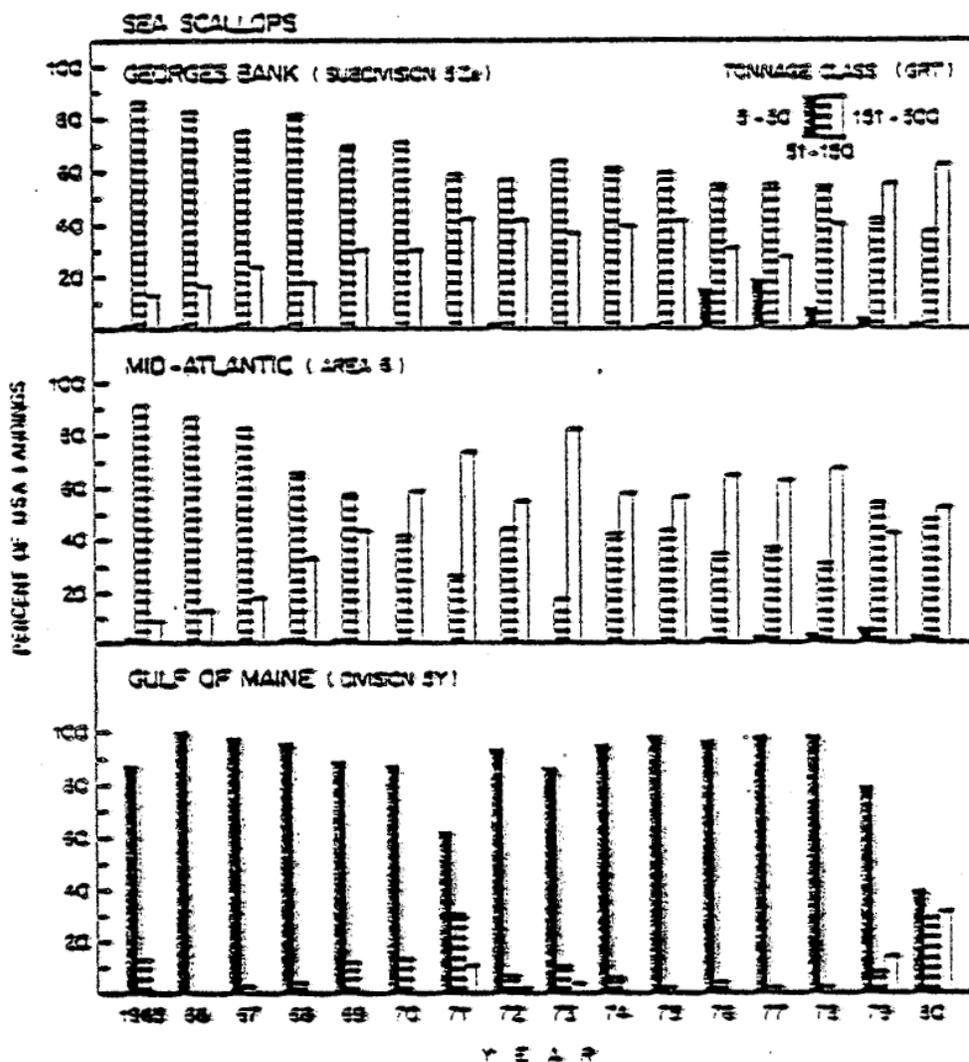


Figure 6. Percent distribution of USA commercial sea scallop landings (metric tons, meats), by vessel tonnage class, from Georges Bank (Subdivision 52e), the Middle Atlantic (Area 6) and the Gulf of Maine (Division 5Y), 1965-1980. The distributions reflect the percent of USA sea scallop landings within each geographical area accounted for by the three vessel classes annually. Data derived from vessels using scallop dredges and landing in New England (1965-1980) and New Jersey (1978-1980) ports.

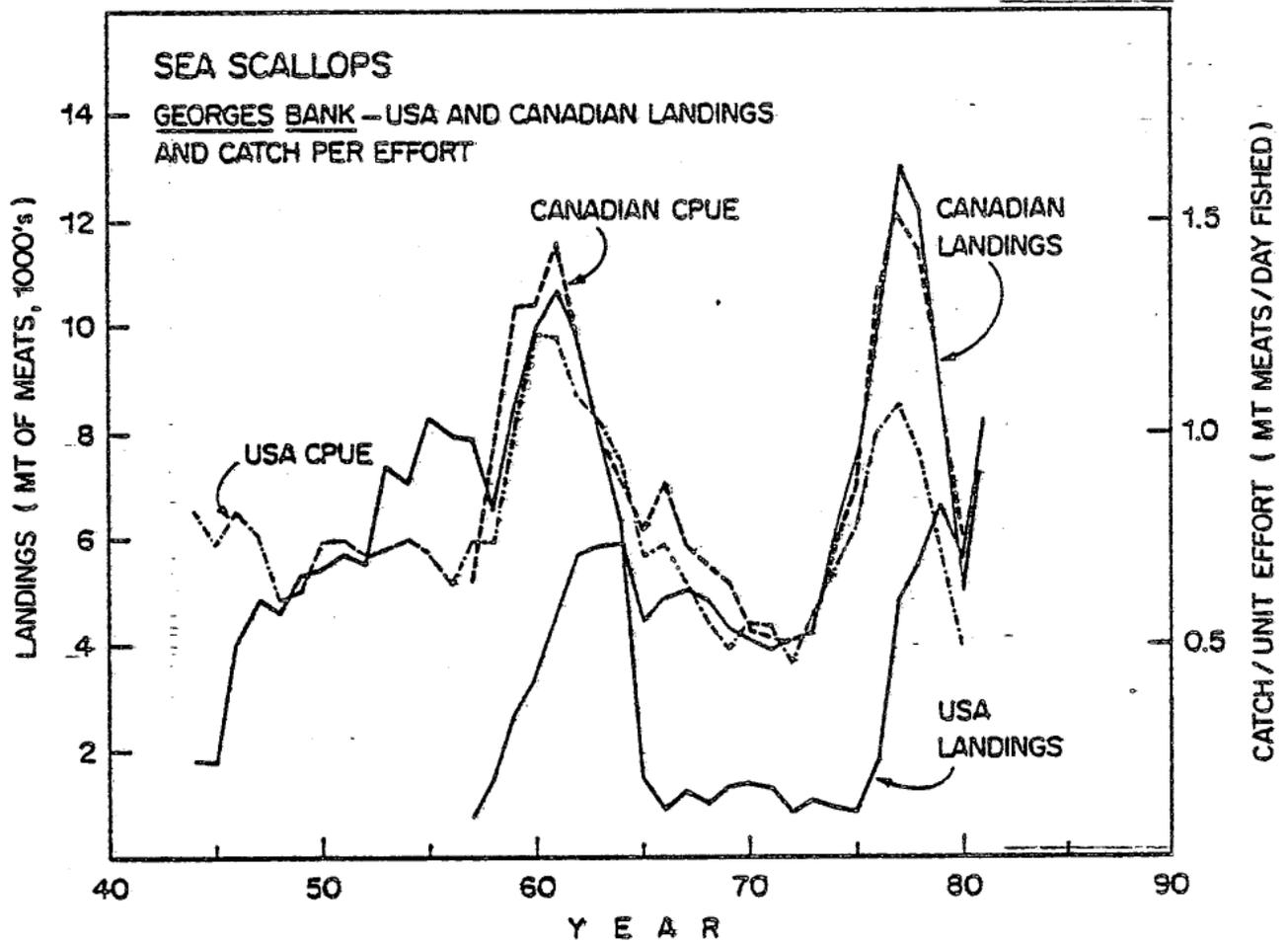


Figure 7. USA and Canadian commercial sea scallop landings (metric tons, meats) and commercial catch per unit of effort (CPUE: metric tons of meats landed per day fished) from Georges Bank (Area 5Ze), 1944-1981.

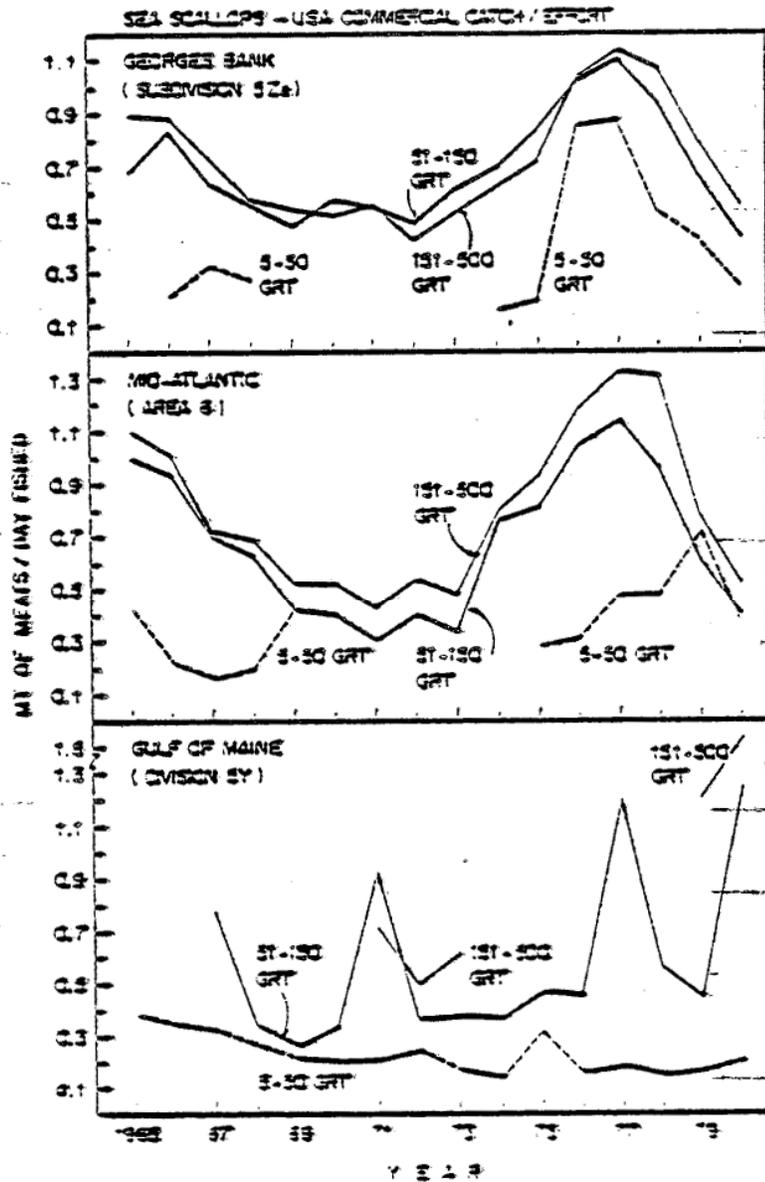


Figure 8. USA commercial sea scallop catch rates (metric tons of meats landed per day fished) from Georges Bank (Subdivision 5Ze), the Middle Atlantic (Area 6) and the Gulf of Maine (Division 5Y), by vessel tonnage class, 1965-1980. Data derived from vessels using scallop dredges and landing in New England (1965-1980) and New Jersey (1978-1980) ports.

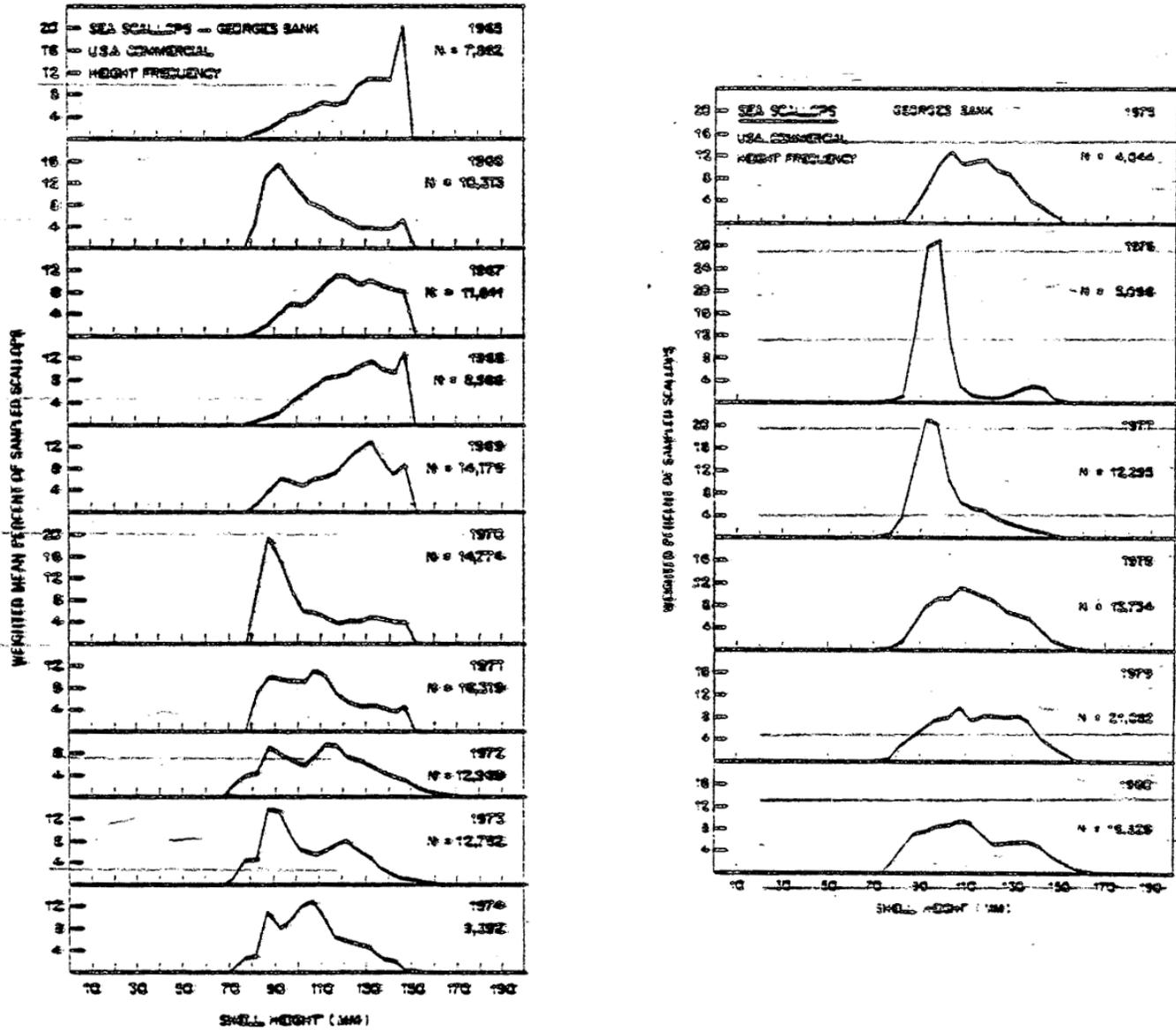


Figure 9. Shell height frequency distributions of USA commercial sea scallop samples from Georges Bank (area 5Ze), 1965-1980. Each yearly distribution was derived by weighting USA commercial shell height frequency distributions from the South Channel, Southeast Part, and Northern Edge and Peak regions in each year by the respective annual USA commercial sea scallop landings from these regions.

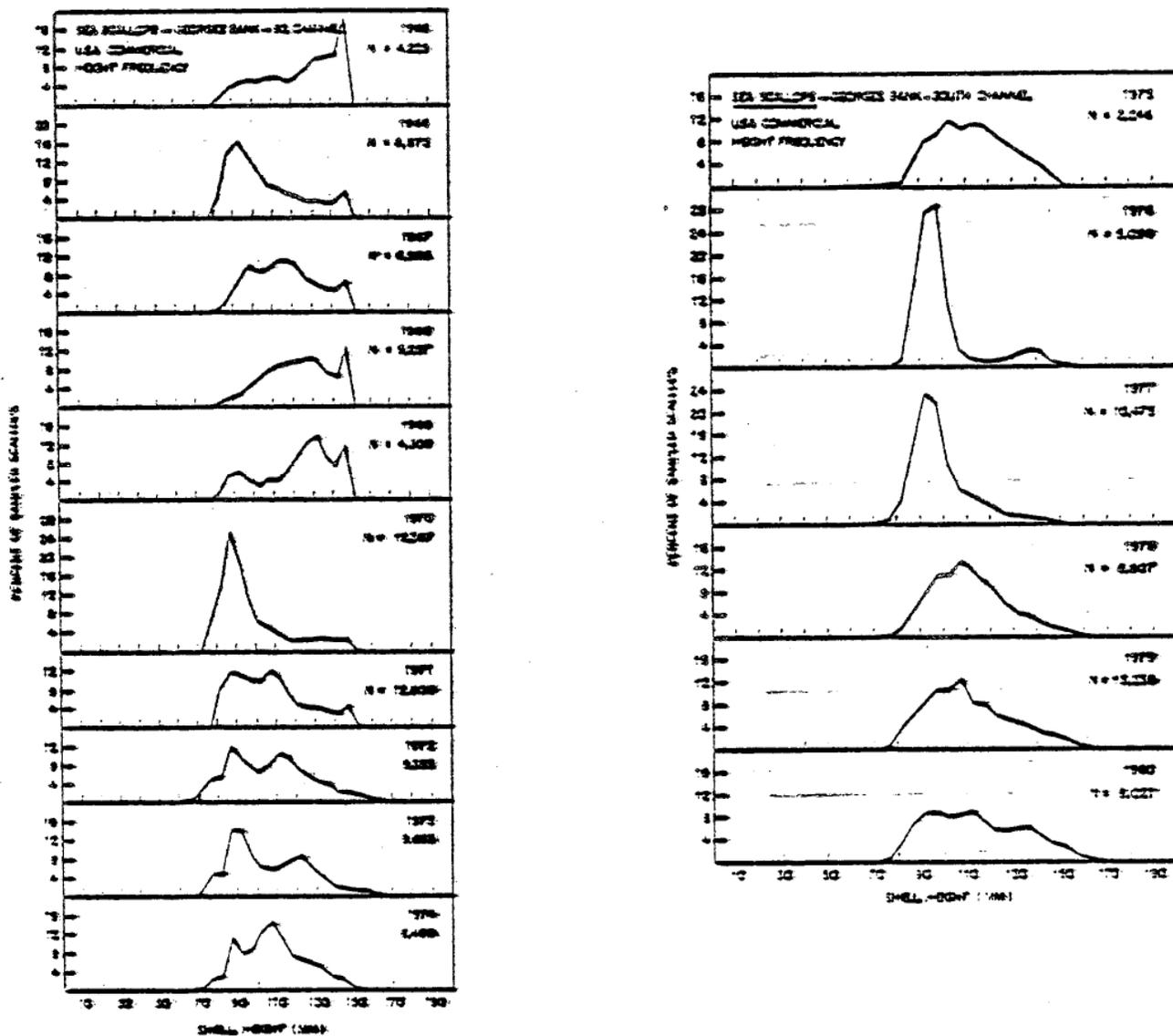


Figure 10. Shell height frequency distributions of USA commercial sea scallop samples from the South Channel region (Statistical Areas 521, 522, and 526) of Georges Bank, 1965-1980.

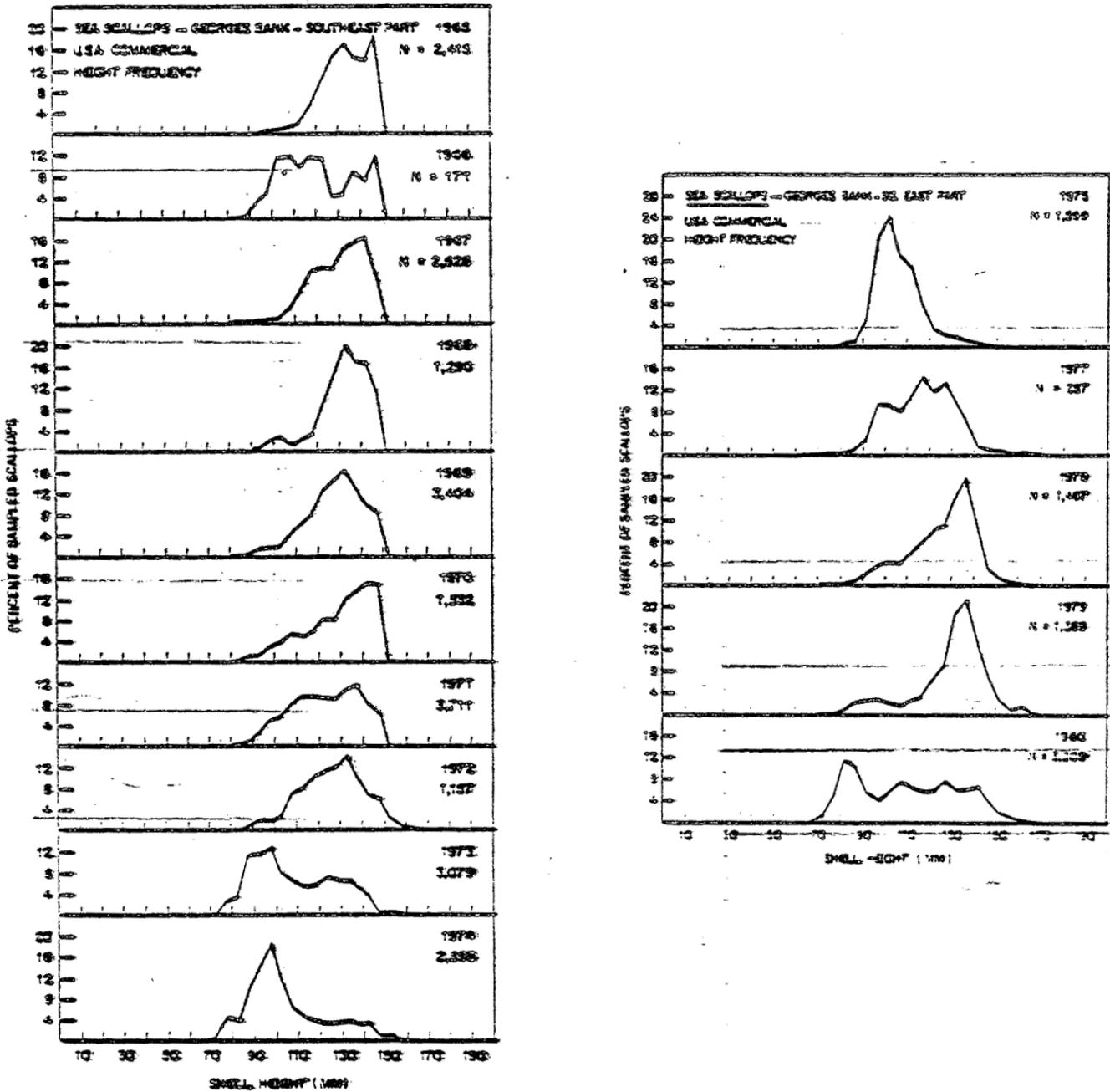


Figure 11. Shell height frequency distributions of USA commercial sea scallop samples from the Southeast Part region (Statistical Area 525) of Georges Bank, 1965-1980. No samples were obtained in 1976.

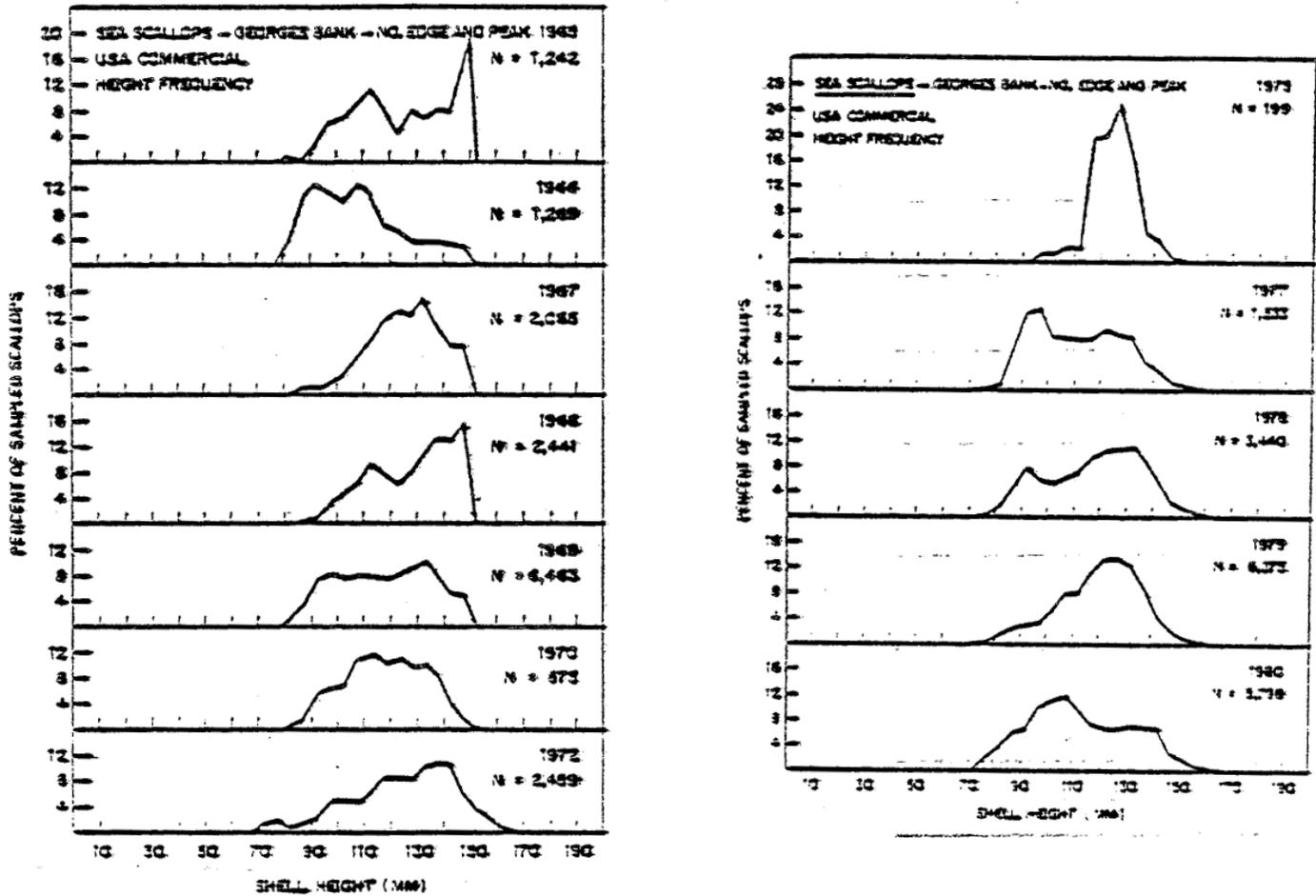


Figure 12. Shell height frequency distributions of USA commercial sea scallop samples from the Northern Edge and Peak region (Statistical Areas 523 and 524) of Georges Bank, 1965-1980. No samples were obtained in 1971, 1973, 1974, and 1976.

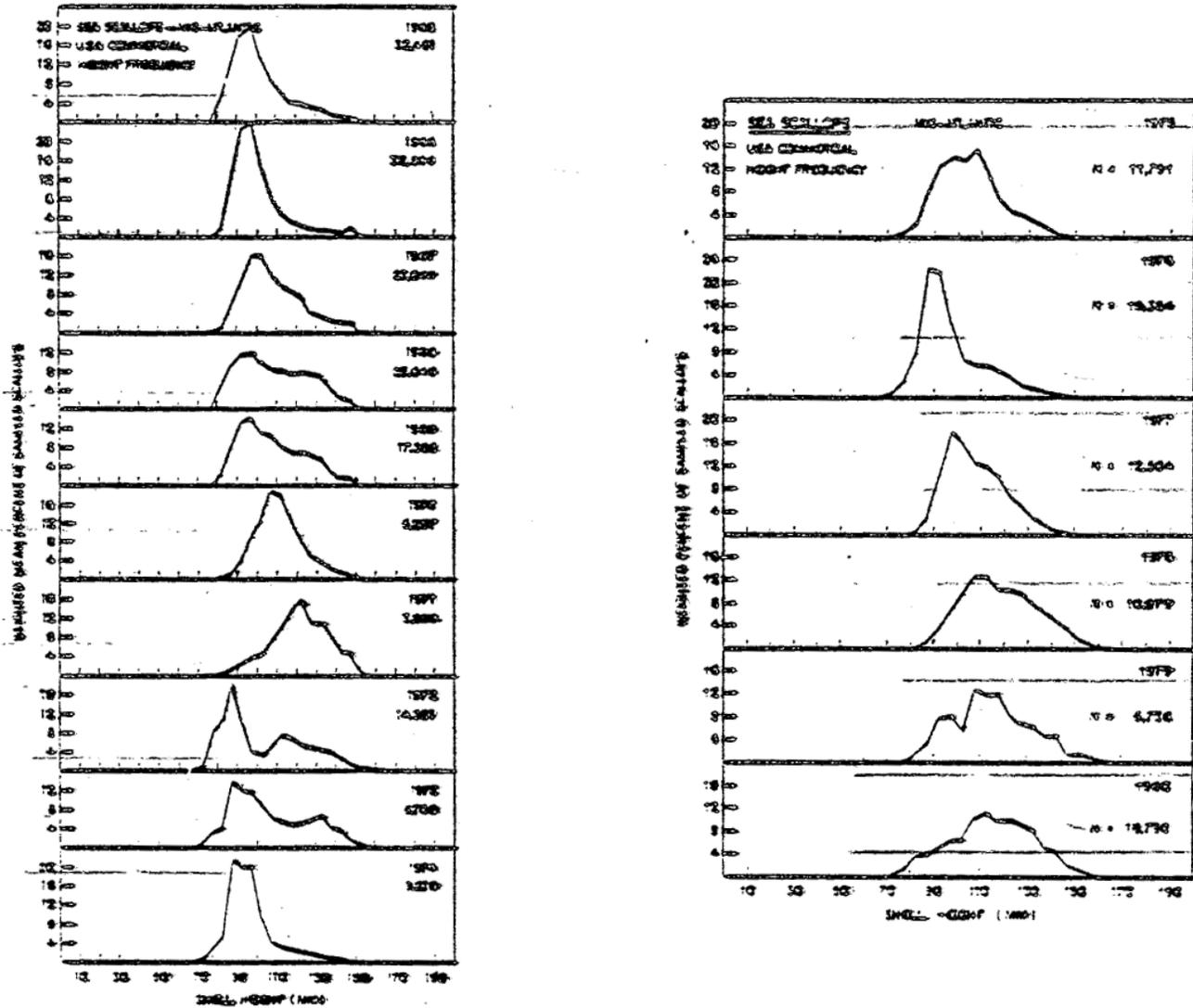


Figure 13. Shell height frequency distributions of USA commercial sea scallop samples from the Middle Atlantic (Area 6), 1965-1980. Each yearly distribution was derived by weighting USA commercial shell height frequency distributions from the New York Bight, Delmarva, and Virginia-North Carolina regions in each year by the respective annual USA commercial sea scallop landings from these regions.

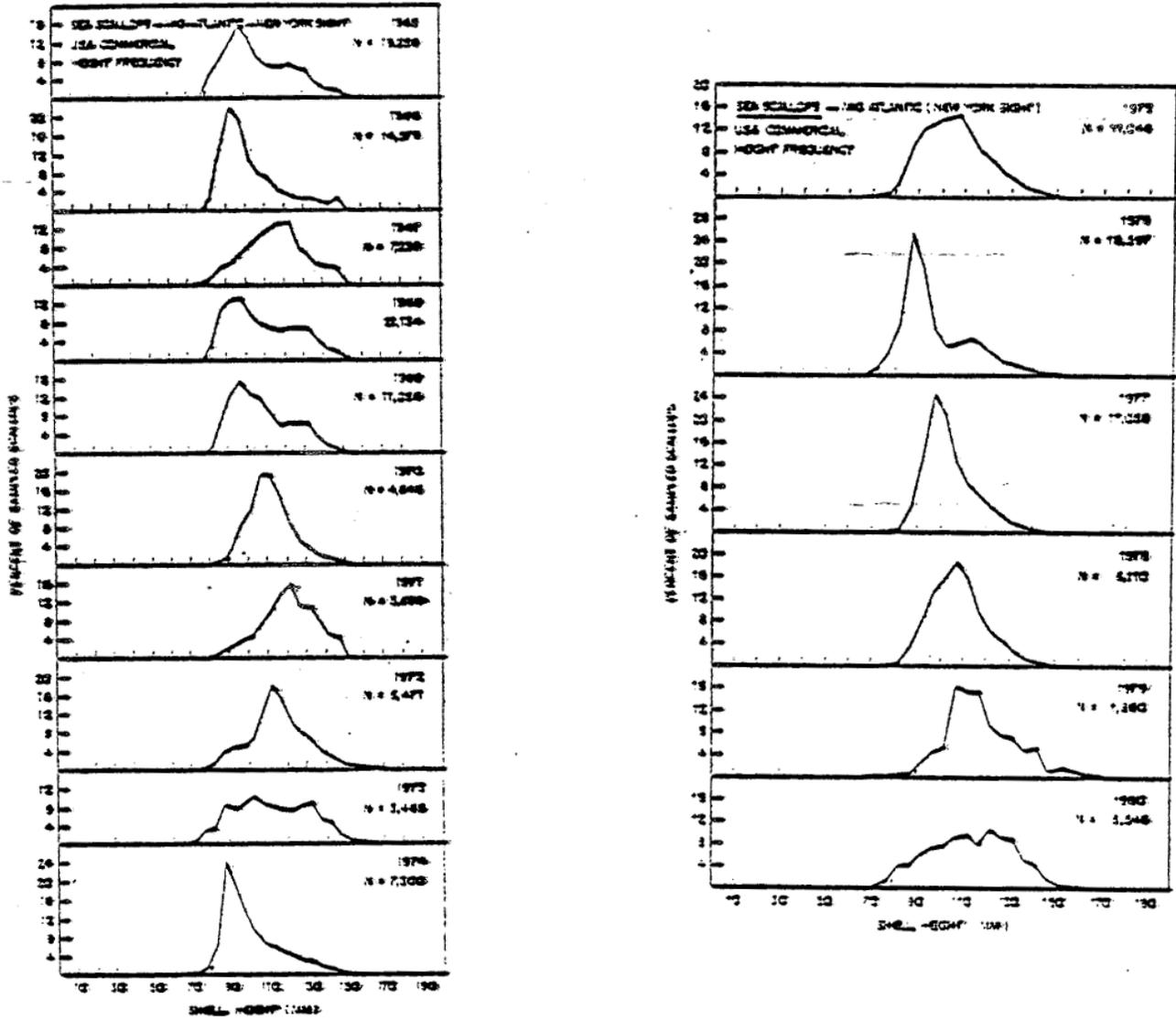


Figure 14. Shell height frequency distributions of USA commercial sea scallop samples from the New York Bight region (Statistical Areas 611-616) of the Middle Atlantic, 1965-1980.

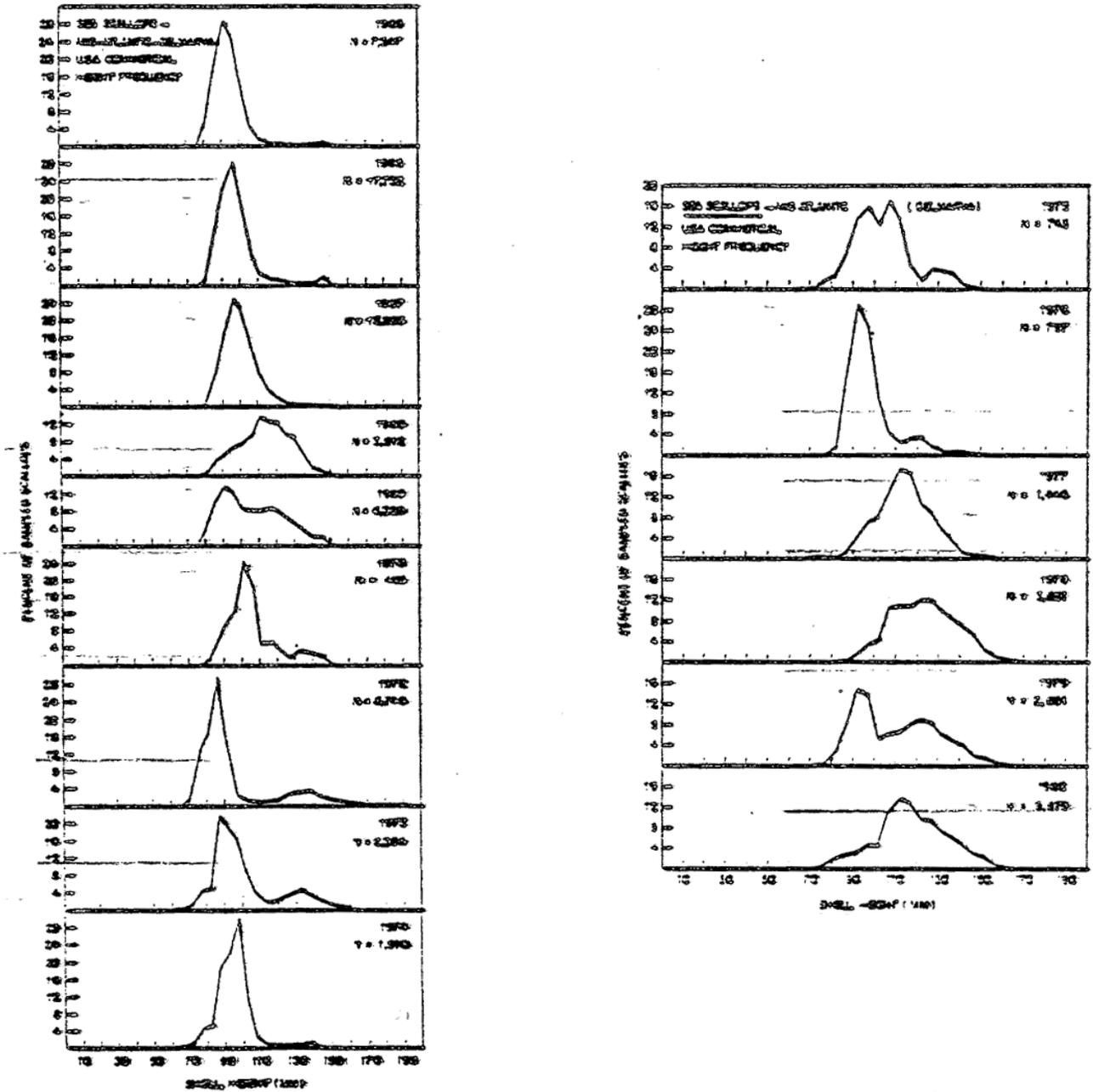


Figure 15. Shell height frequency distributions of USA commercial sea scallop samples from the Delmarva region (Statistical Areas 621-626) of the Middle Atlantic, 1965-1980. No samples were obtained in 1971.

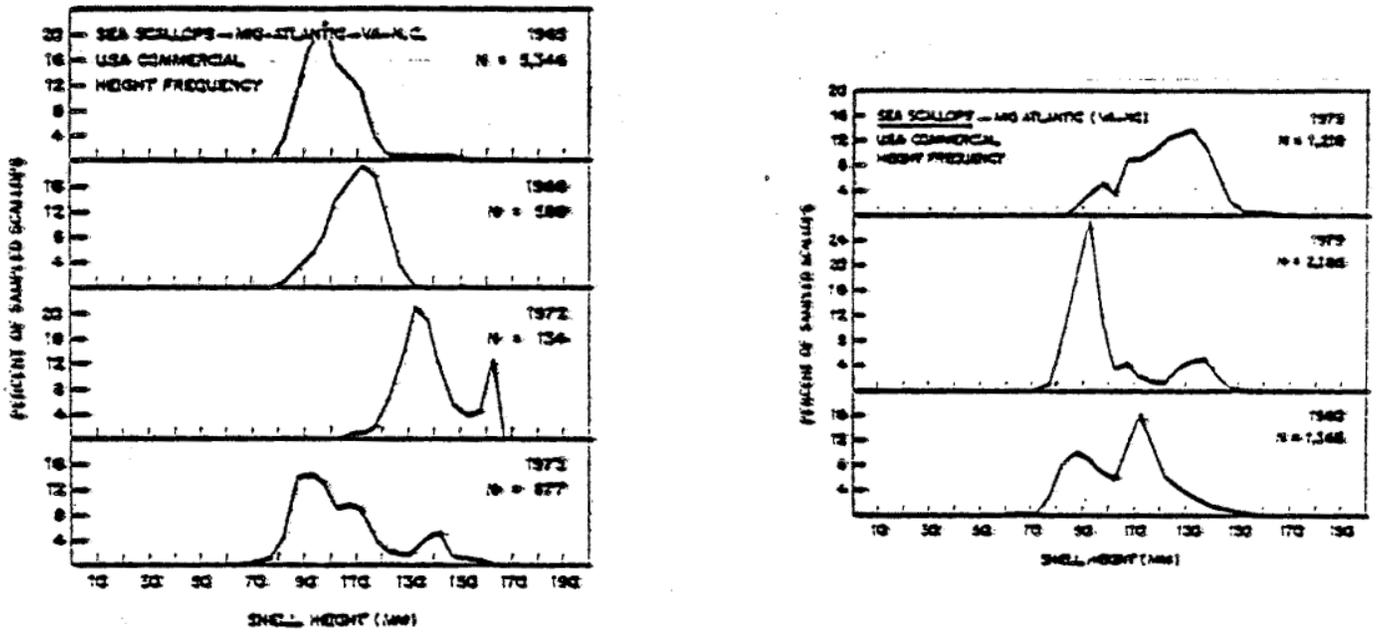


Figure 16. Shell height frequency distributions of USA commercial sea scallop samples from the Virginia-North Carolina region (Statistical Areas 631-632) of the Middle Atlantic, 1965-1980. No samples were obtained during 1967-1971 and 1974-1977.

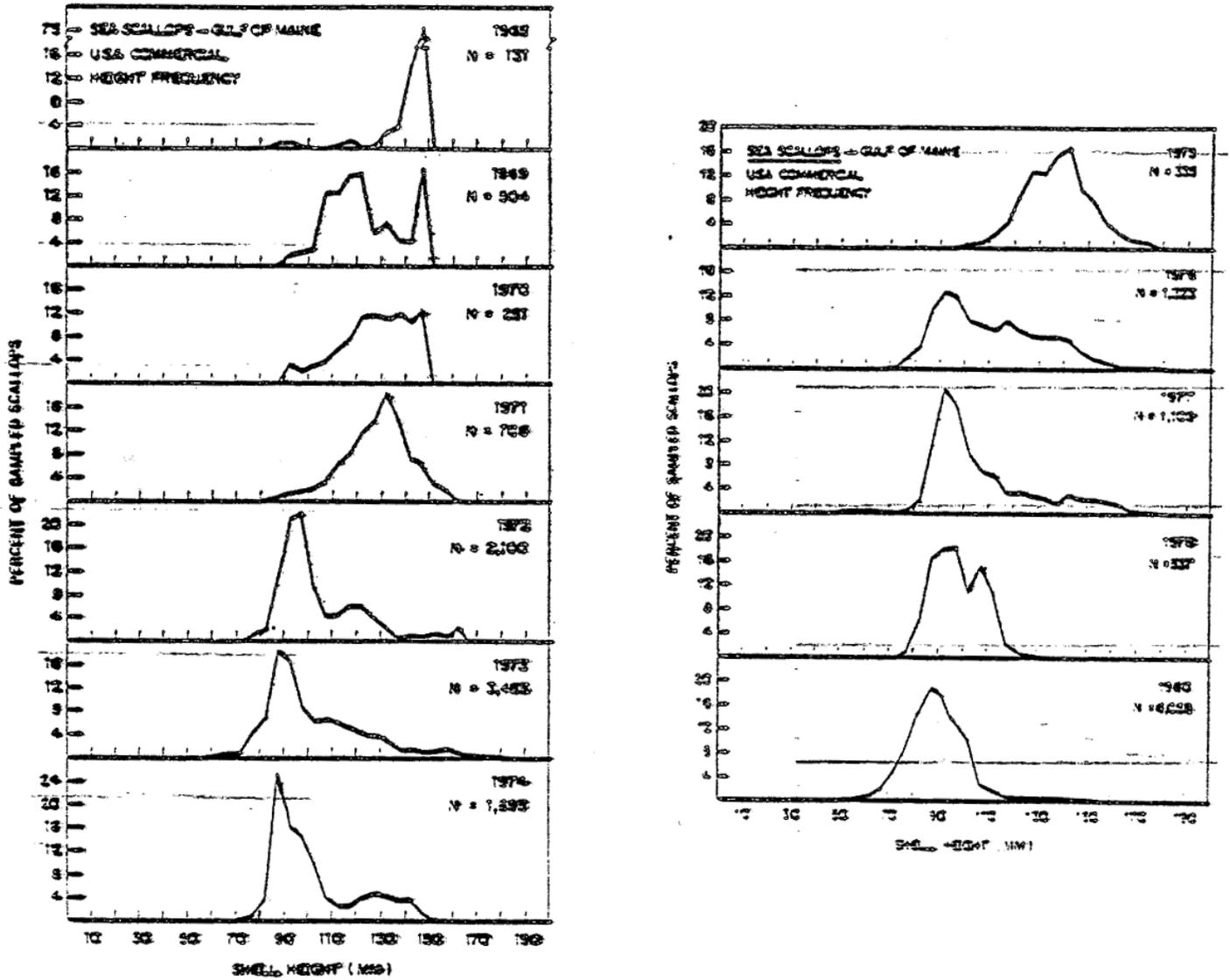


Figure 17. Shell height frequency distributions of USA commercial sea scallop samples from the Gulf of Maine (Statistical Areas 511-515), 1965-1980. No samples were obtained during 1966-1968 and in 1979.

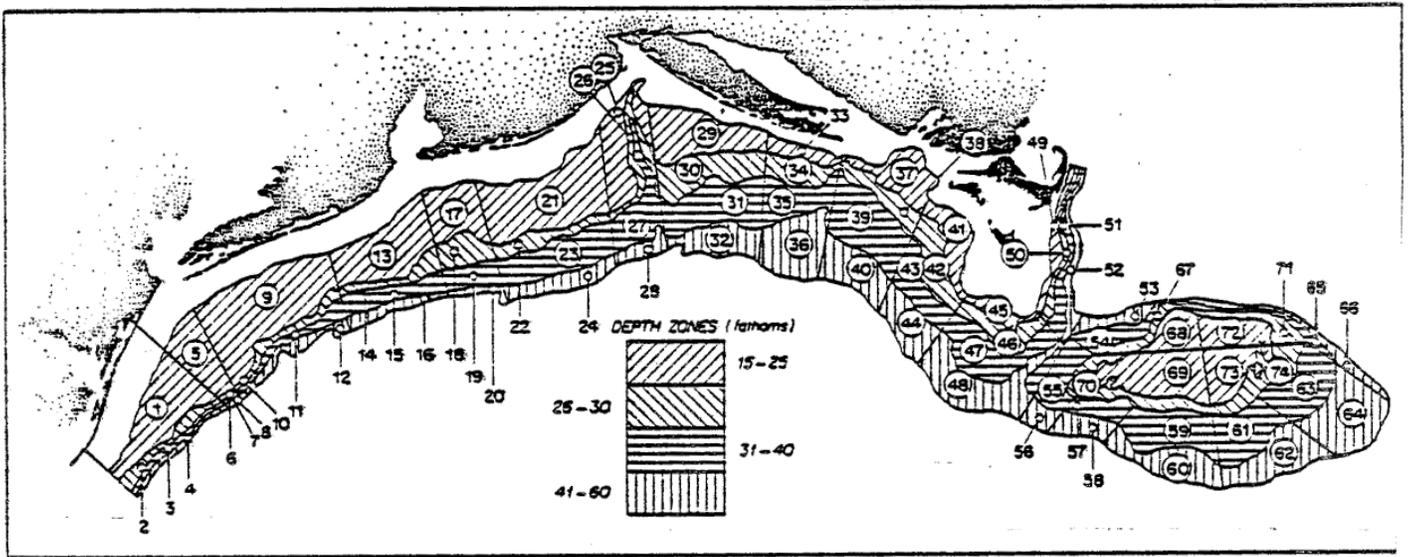


Figure 18. USA (Northeast Fisheries Center) sea scallop research vessel survey sampling strata in the Northwest Atlantic, Georges Bank to Cape Hatteras, used in annual surveys since 1979. For analytical purposes, survey strata are grouped by major fishing regions: Virginia-North Carolina (Strata 1-8); Delmarva (Strata 9-20); New York Bight (Strata 21-36); Southern New England (Strata 37-44); South Channel (Strata 45-56); Southeast Part (Strata 57-60); and Northern Edge and Peak (Strata 61-66, 71-74).

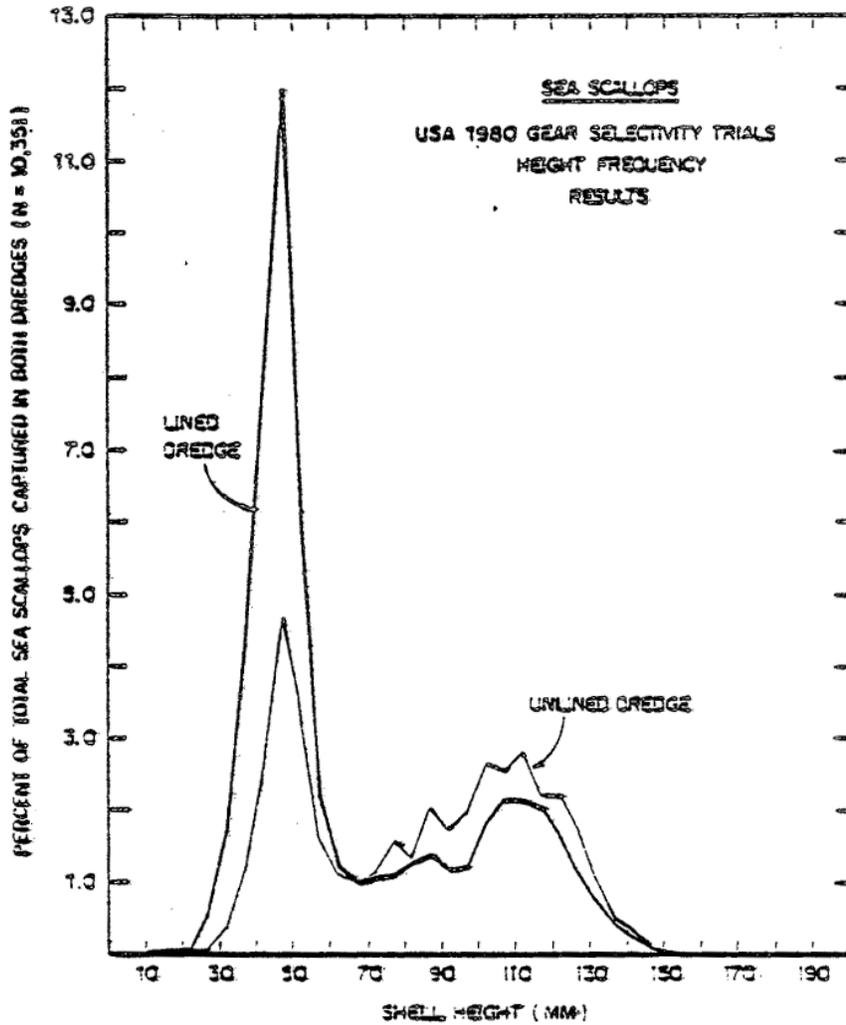


Figure 19. Shell height frequency distributions of sea scallops obtained in USA alternate-tow, research survey dredge size-selectivity experiments conducted with lined and unlined 2.44 meter (8 foot) sea scallop dredges in the Middle Atlantic during 1980 (from Serchuk and Smolowitz 1980: p. 19).

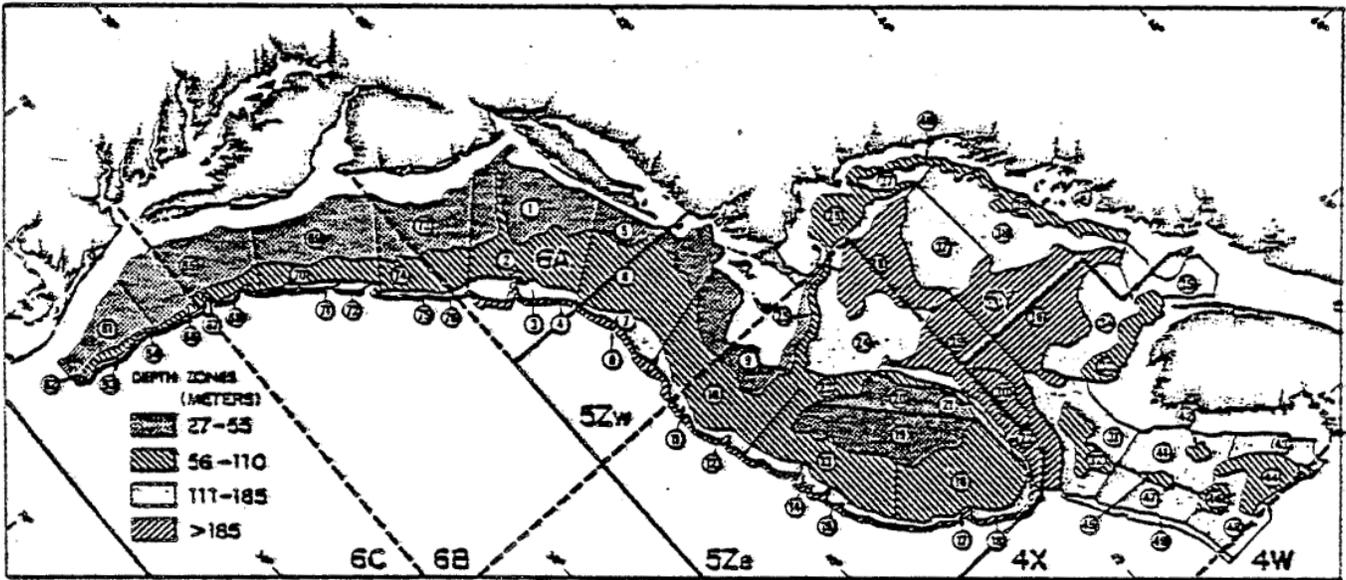


Figure 20. USA (Northeast Fisheries Center) offshore (>27 m) bottom trawl survey sampling strata in the Northwest Atlantic, Nova Scotia to Cape Hatteras. Gulf of Maine strata in which sea scallop catches were analyzed include 26, 39, and 40 (31-60 fm) and 27, 37, and 38 (61-100 fm).

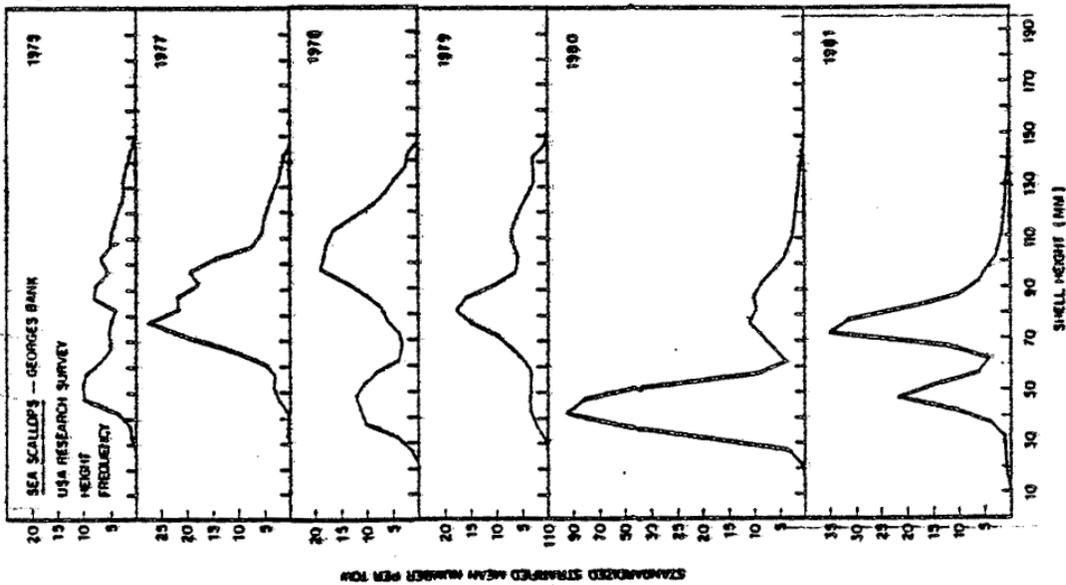


Figure 21. Sea scallop research vessel survey shell height frequency distributions of sea scallops from Georges Bank (Strata 45-66, 71-74), 1975, 1977-1981. Frequency distributions for 1975 and 1977 were derived from USA research vessel surveys. Frequency distributions for 1978-1981 were derived from both USA and Canadian research vessel surveys.

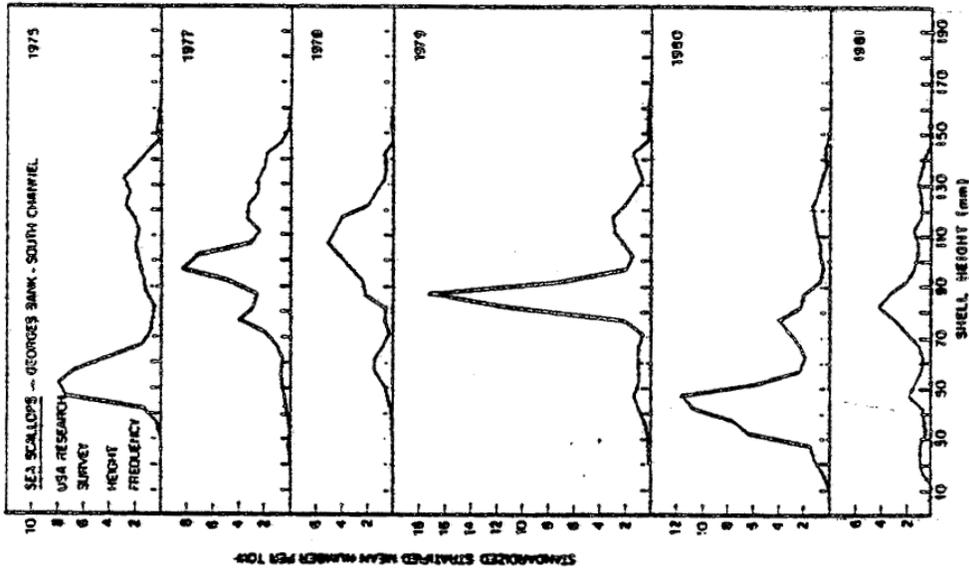


Figure 22. USA sea scallop research vessel survey shell height frequency distributions of sea scallops from the South Channel region (Strata 45-56) of Georges Bank, 1975, 1977-1981.

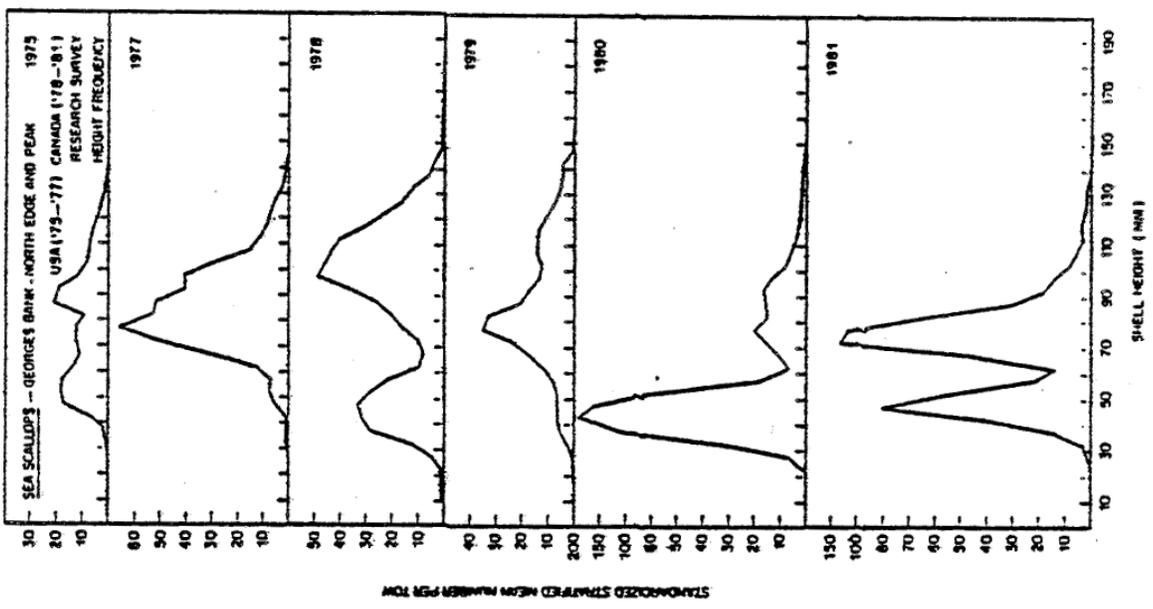


Figure 23. USA sea scallop research vessel survey shell height frequency distributions of sea scallops from the Southeast Part region (Strata 57-60) of Georges Bank, 1975, 1977-1981.

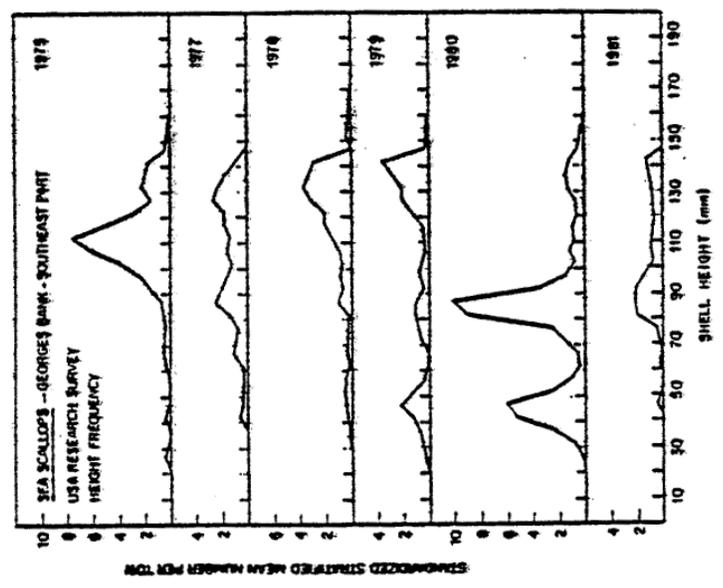


Figure 24. Sea scallop research vessel survey shell height frequency distributions of sea scallops from the Northern Edge and Peak regions (Strata 61-66, 71-74) of Georges Bank, 1975, 1977-1981. Frequency distributions for 1975 and 1977 were derived from USA research vessel surveys. Frequency distributions for 1978-1981 were derived from Canadian research vessel surveys.

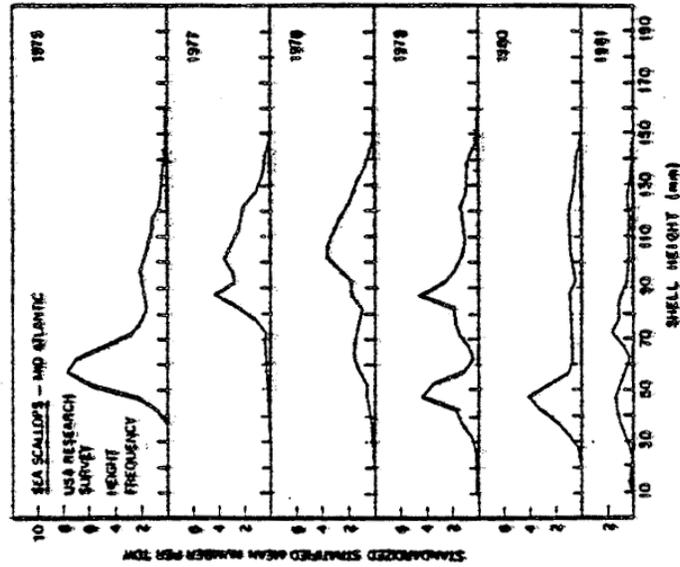
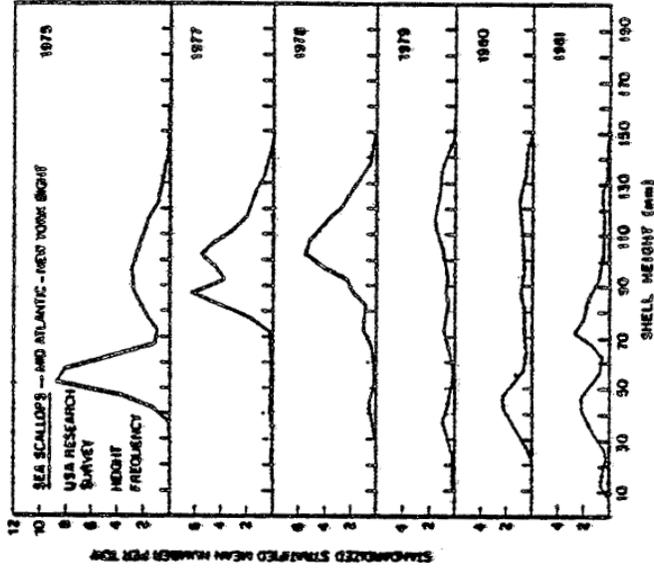


Figure 25. USA sea scallop research vessel survey shell height frequency distributions of sea scallops from the Middle Atlantic (Strata 1-36), 1975, 1977-1981.

Figure 26. USA sea scallop research vessel survey shell height frequency distributions of sea scallops from the New York Bight region (Strata 21-36) of the Middle Atlantic, 1975, 1977-1981.

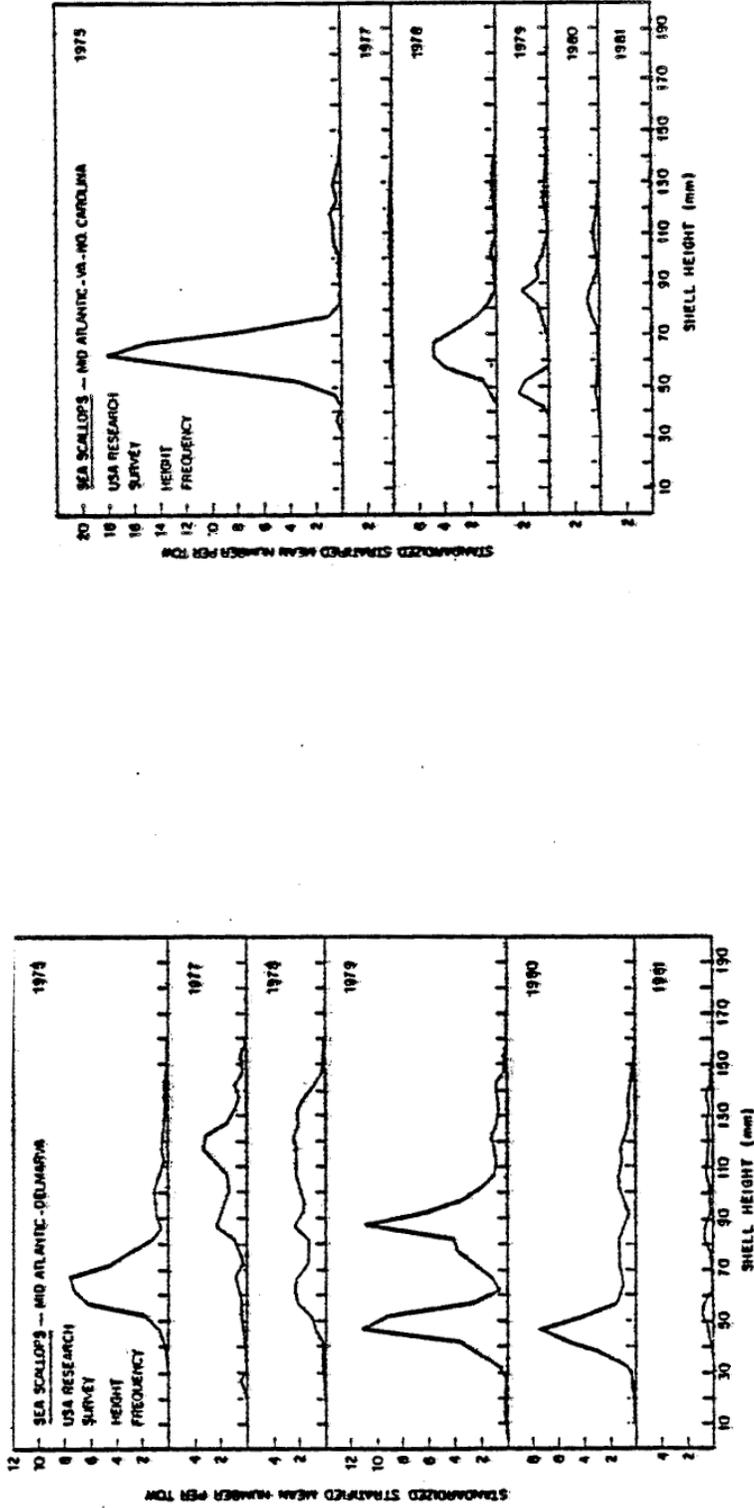


Figure 27. USA sea scallop research vessel survey shell height frequency distributions of sea scallops from the Delmarva region (Strata 9-20) of the Middle Atlantic, 1975, 1977-1981.

Figure 28. USA sea scallop research vessel survey shell height frequency distributions of sea scallops from the Virginia-North Carolina region (Strata 1-8) of the Middle Atlantic, 1975, 1977-1981.

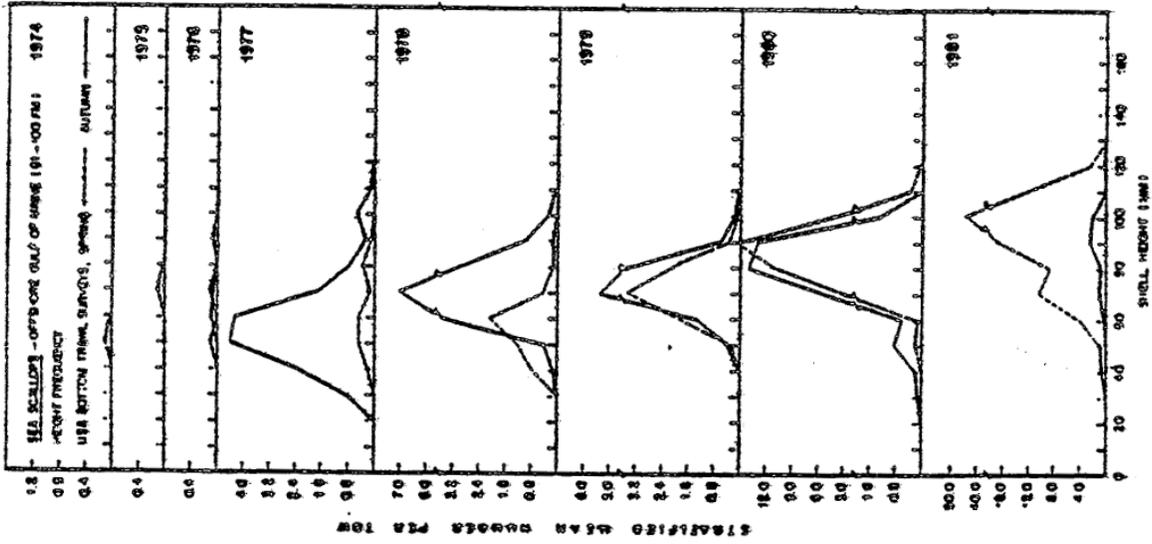


Figure 30. USA offshore spring and autumn research vessel bottom trawl survey shell height frequency distributions of sea scallops from the 61-100 fathom depth zone (Bottom trawl strata 27, 37, and 38) in the Gulf of Maine, 1974-1981.

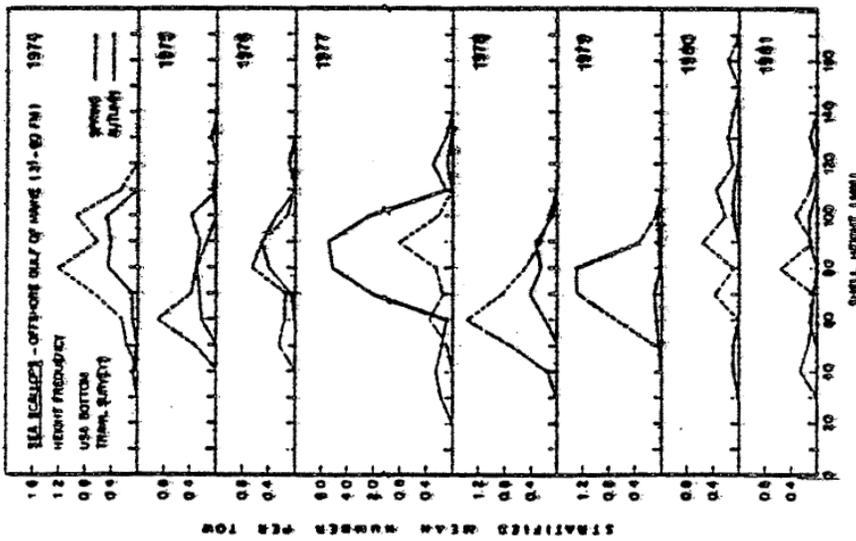


Figure 29. USA offshore spring and autumn research vessel bottom trawl survey shell height frequency distributions of sea scallops from the 51-60 fathom depth zone (Bottom trawl strata 26, 39, and 40) in the Gulf of Maine, 1974-1981.

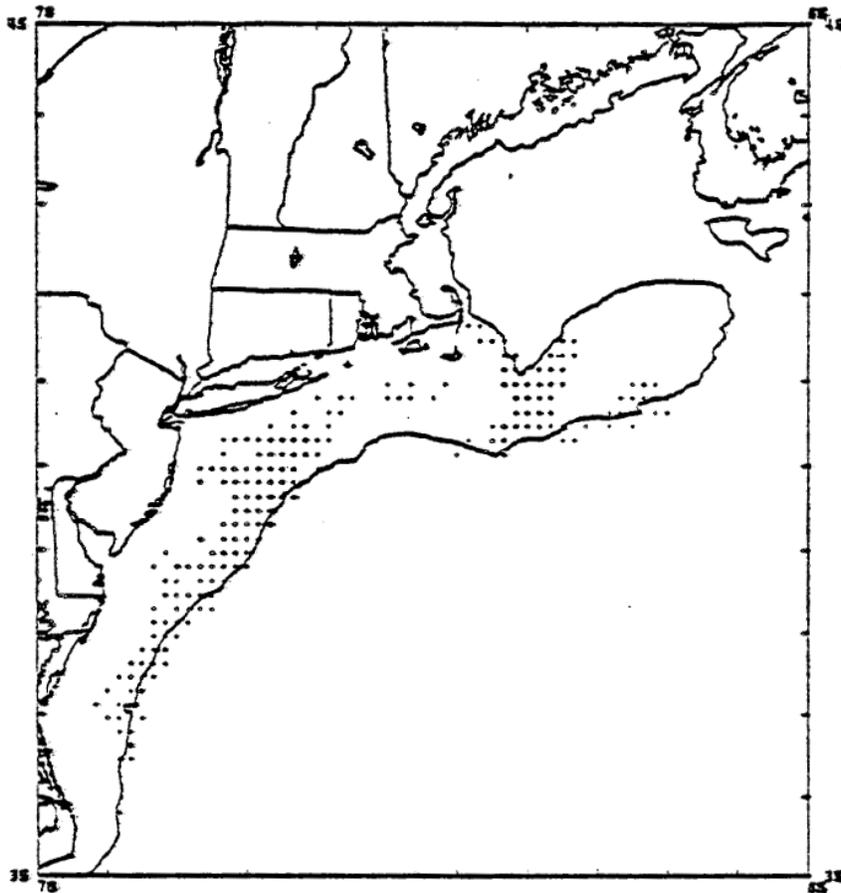


Figure 31. Locations of ten-minute squares of latitude and longitude on Georges Bank and in the Middle Atlantic where sea scallops were collected for shell height-meat weight analyses during USA sea scallop research vessel surveys, 1977-1981. Each point represents the center of a ten-minute square in which samples were obtained and may represent more than one survey station within the ten-minute square at which samples were collected.

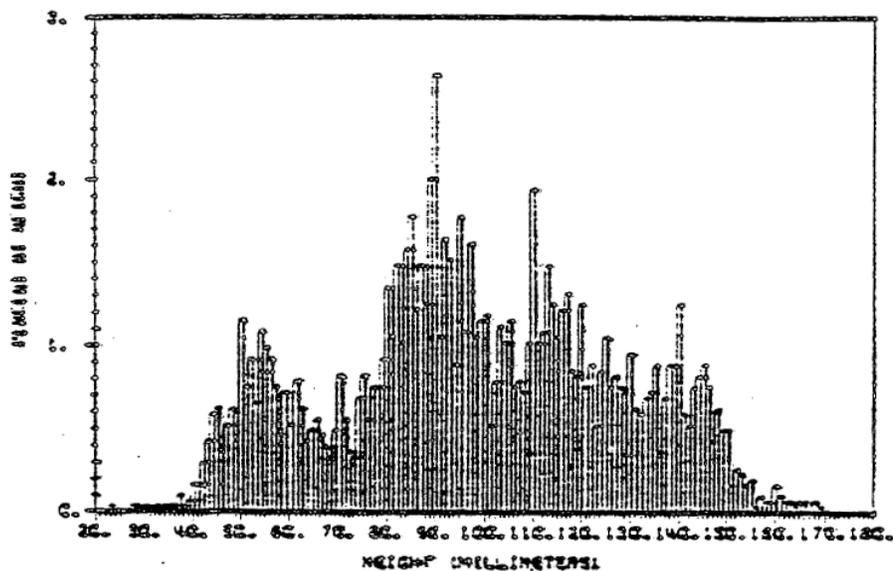


Figure 32. Shell height frequency distribution of Georges Bank sea scallops collected for shell height-meat weight analyses during USA sea scallop research vessel surveys, 1978-1981.

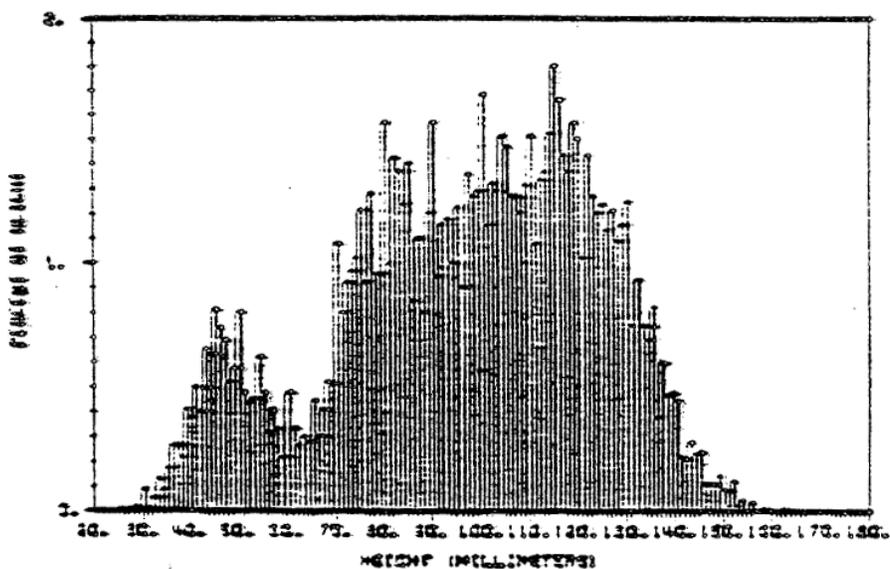


Figure 33. Shell height frequency distribution of Middle Atlantic sea scallops collected for shell height-meat weight analyses during USA sea scallop research vessel surveys, 1977-1981.

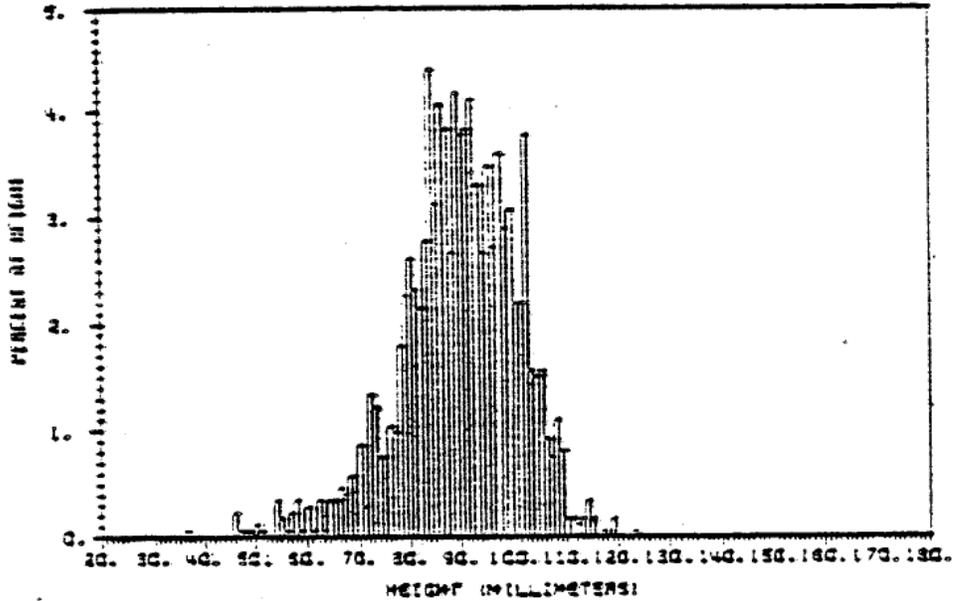


Figure 34. Shell height frequency distribution of offshore Gulf of Maine sea scallops collected for shell height-meat weight analyses from 1980 NMFS and States of Maine and Massachusetts commercial sea scallop samples.

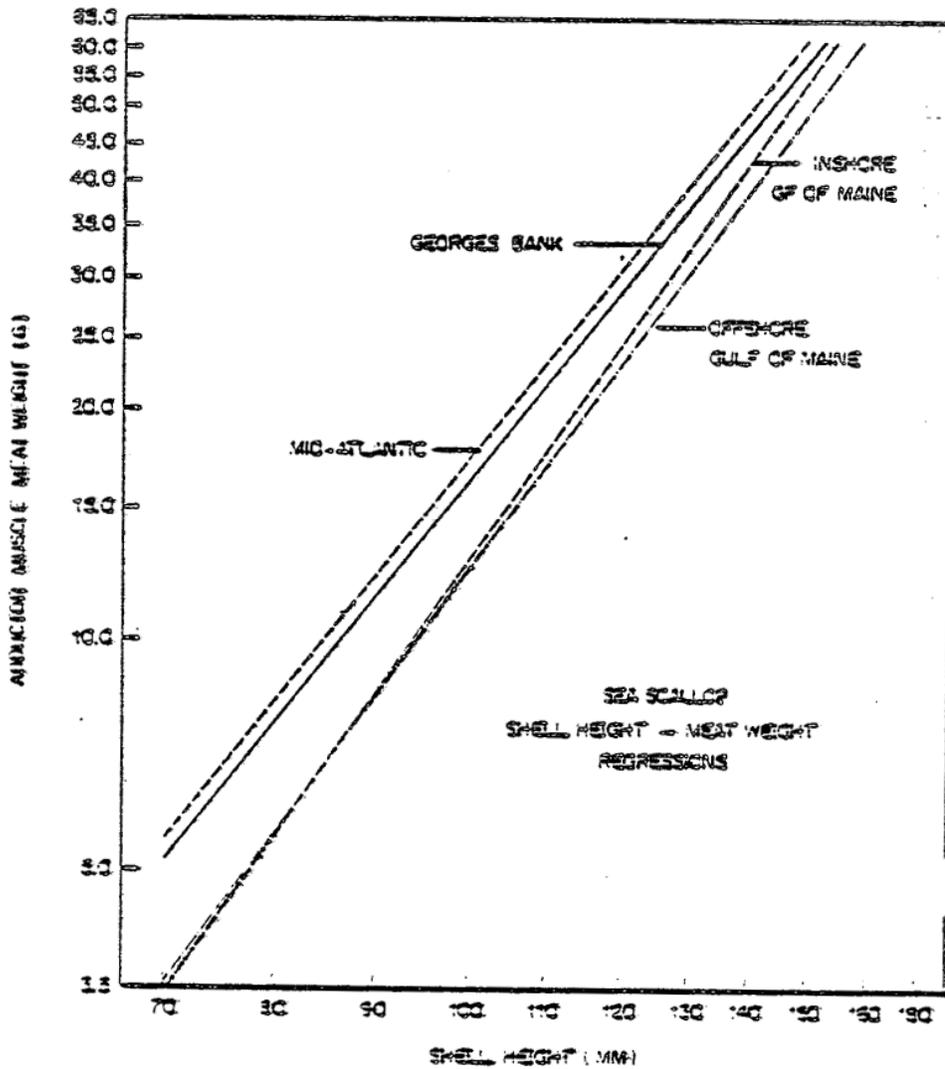


Figure 35. Shell height-meat weight regression relationships for sea scallops taken from Georges Bank (1978-1981 USA scallop surveys), the Middle Atlantic (1977-1981 USA scallop surveys), offshore Gulf of Maine (1980 NMFS and States of Maine and Massachusetts commercial sea scallop samples), and inshore (Penobscot Bay) Gulf of Maine (from Haynes 1966).

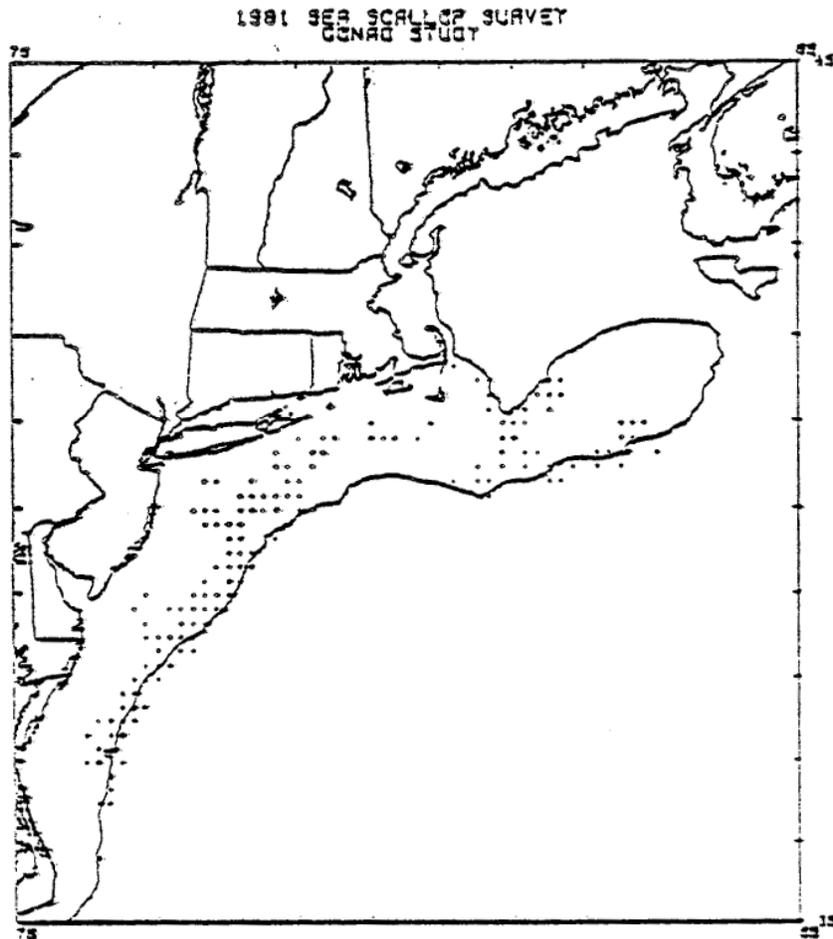


Figure 36. Locations of ten-minute squares of latitude and longitude on Georges Bank and in the Middle Atlantic where sea scallops were collected for shell height-ovary weight and meat weight-ovary weight analyses during the 1981 USA sea scallop research vessel survey. Each point represents the center of a ten-minute square in which ovary samples were obtained and may represent more than one survey station within the ten-minute square at which ovary samples were collected.

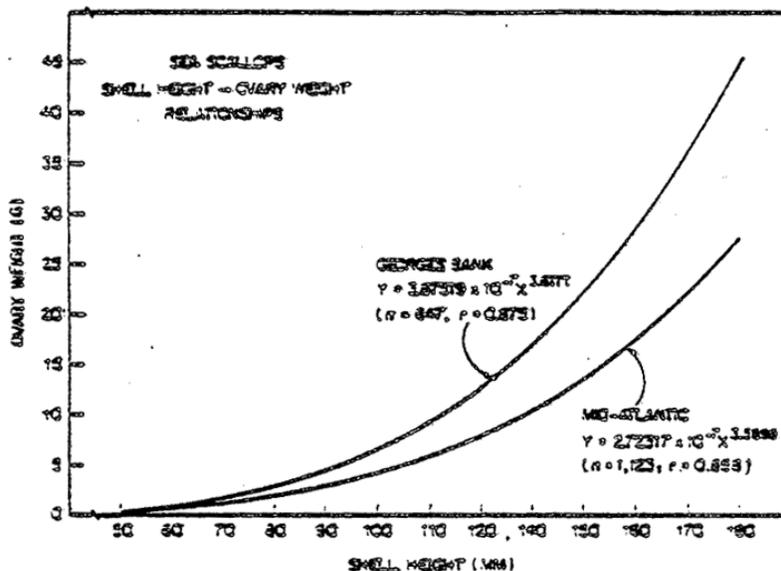


Figure 37. Shell height-ovary weight relationships for sea scallops sampled from Georges Bank and the Middle Atlantic during the 1981 USA sea scallop research vessel survey.

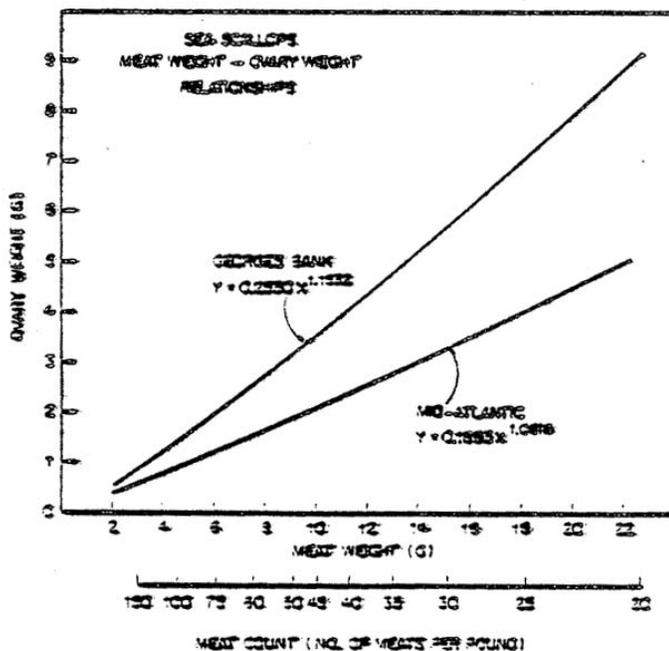


Figure 38. Meat weight-ovary weight relationships for sea scallops sampled from Georges Bank and the Middle Atlantic during the 1981 USA sea scallop research vessel survey.

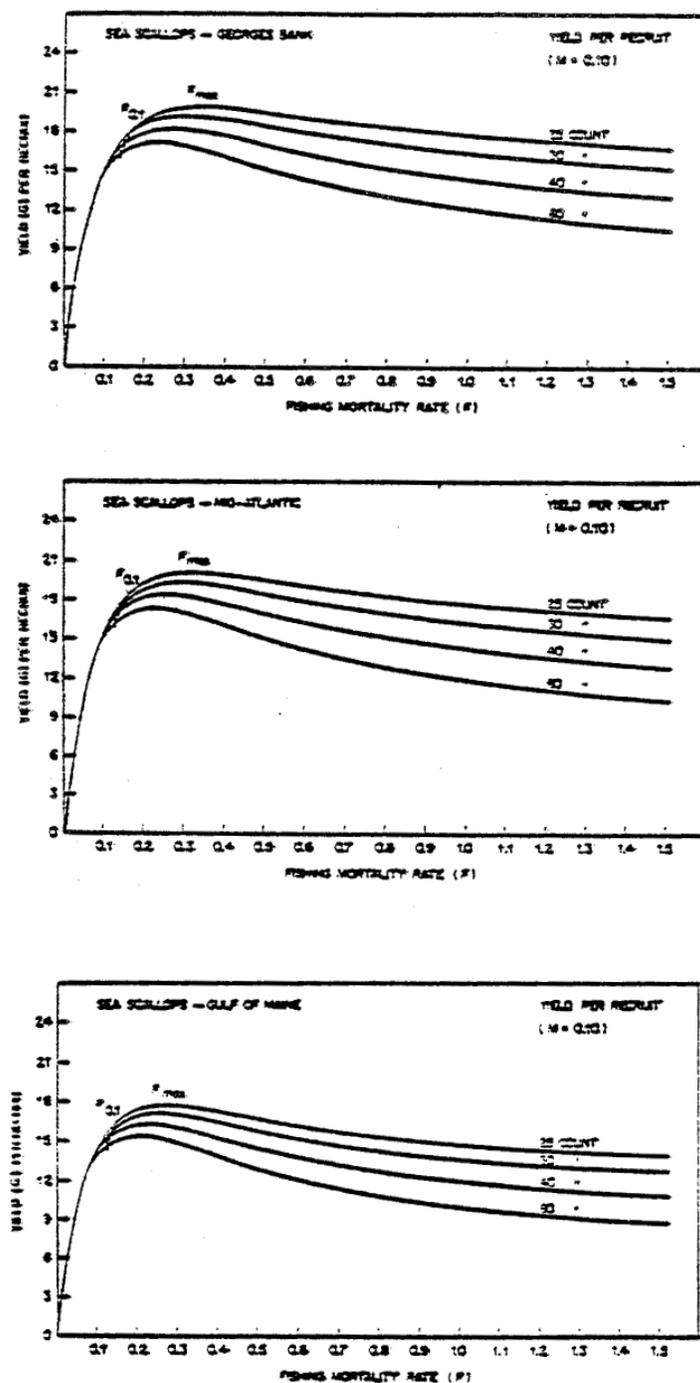


Figure 39. Yield (grams, meat weight) per recruit for Georges Bank, Middle Atlantic, and Gulf of Maine sea scallops as a function of fishing mortality rate (F) and age at entry to the fishery corresponding to 25, 30, 40, and 60 meat count scallops.  $F_{max}$  and  $F_{0.1}$  values are indicated for each yield per recruit curve. All analyses were performed using the Paulik and Gales (1964) allometric yield per recruit model with natural mortality rate (M) = 0.1 and age at recruitment ( $t_p$ ) = 2.0 years. Meat counts refer to the number of scallop meats in a pound.